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Designing Commenting Mechanisms for Dynamic Media: Synchronous Overlay and Adjacent Scrollable

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Abstract

Online interactions with dynamic media include both the content of media clips and comments, the latter expressing users' thoughts and attitudes towards media clips and one another. Effective interfaces must thus jointly support engagement with dynamic media as well with the viewpoints of others. In this paper, we report an experimental comparison of user interaction and engagement with two alternative designs for presenting comments on dynamic media: 'danmaku' Synchronous Overlay (SO) and Adjacent Scrollable (AS). Twenty participants each played two video clips of different political speeches, one with SO and the other with AS. Our findings suggest that when using SO participants felt a stronger sense of togetherness but remembered less about the comments than when using AS. We argue that commenting mechanisms are powerful elements of interaction design for making sense of others' opinions and feelings.

Author Keywords

Video commenting; danmaku; political speeches.

ACM Classification Keywords

H.5.2 [User Interfaces]: Interaction Styles; H.5.3 [Group and Organization Interfaces]: Computer-supported cooperative Work

Introduction

Worldwide use of YouTube has exceeded a billion hours of video playing per day [8]. Online interactions with dynamic media sites are highly collective. People who use them typically see text-based comments left by others as well as media clips. Comments express thoughts, opinions and feelings about the media clip as some visitors attempt to enlighten, amuse or anger others. Comments reflexively promote the generation of dialogue around a clip, as users react to others' comments and exchange viewpoints on the clip: user experience owes to the manner in which these elements are combined. Consequently, the interaction design challenge for media players encompasses support for an integrated engagement with dynamic media and user comments. Amongst other things, integration must address the reference of a comment: a user might not be recording an overarching reaction to a whole clip; rather, she might wish to focus on a specific moment within the clip [3].

It can be difficult to relate particular comments to point events or sections of a video if mechanisms allow only appending of comments beneath a clip, as is the case for YouTube. Various alternative mechanisms have been proposed to support comment and conversation around video watching, especially in research on interactive TV.

The inclusion of friends or relatives as part of TV watching experience drives interaction design from a different point of departure: dynamic media could facilitate social conversations [6, 7]. Ducheneaut et. al. [1] developed the Social TV with a shared audio channel for the users to chat. Telebud-dies [4] created social events such as quiz as an addition to a video stream. These efforts have been premised on live broadcasts rather than interacting with persistent or archived media. Consequently, they assume a synchronous communication model for human interactions. Nathan et.

al.'s work on CollaboraTV is of particular interest to us because their mechanism could translate to persistent interactions [6]. CollaboraTV introduced interactions in which viewers could add comments as an overlay whilst watching TV programmes. An overlay mechanism could allow the addition of new comments by viewers who see programmes at different times.

Overlaid commenting for video clips, or 'danmaku', has been popular in Japan and China since 2014 [5]. Users can add text at exact time points, which floats above the media content, synchronized to appear with particular scenes and events. Ma and Cao [5] argue that danmaku (hereafter referred to as Synchronous Overlay - SO) supports interactions between viewers as they navigate points of reference between comments and content, and between comments and one another.

All commenting mechanisms place attentional demands on viewers as they must split their focus between what is happening in the video and the meaning of comments left by others. SO can resolve the reference of comments easily but demands an immediate interpretation before they disappear and can occlude media content. These factors may influence intelligibility of content and comments and engagement with the experience as a whole.

The question we address in this paper is whether engagement, modes of interaction (play, pause, rewind) and memory for content and comments would vary between SO and an alternative design which reduces the degree of coupling between content and comment and avoids occlusion.

Adjacent Scrollable and Synchronous Overlay

Two versions of a video player were configured to display comments in alternative ways. Both players were designed to present video clips with exactly the same height and



Figure 1: Experimental SO video player (700px × 390px)

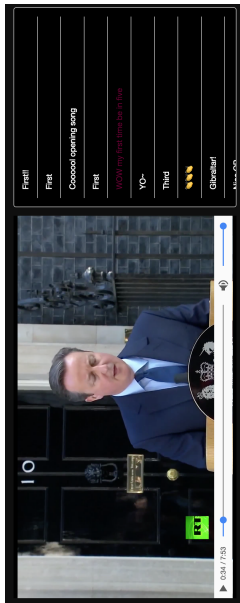


Figure 2: Experimental AS video player (700px × 390px)

width, and to display anonymous comments in the same size and style of font (Figure 1 and 2). One implemented an SO commenting design and was constructed by the authors based on the open source ABPlayerHTML5¹. The alternative player was designed to present comments in a graphical panel attached to the right-hand edge of a video clip. It was implemented with HTML5 and the Bootstrap web framework². The comment panel was scrollable so that the subset of comments visible to the user at any time remained permanently under their own control. We term this an 'Adjacent Scrollable' design (Figure 2).

Method

Our investigation began with an open-ended qualitative study of five participants who interacted with three SO-commented video clips: a minions short movie, a short speech and a drama trailer. Our participants adjusted their play behaviour in response to comments and felt as though they were part of a live experience. For example, "*I saw a lot of people recommending me to pause ... [so I] stopped there and it was very funny*". We posited that user experience with video might be influenced by different commenting mechanisms because the rigid coupling of comment and content in SO enforces a continuous juxtaposition of the two. This may assist with a fluid sense of social engagement but it can also make the most popular moments in media clips hardest to appreciate: they are also sections with the highest density of attention-demanding and occluding comments. These observations are consistent with Ma and Cao's large-scale study of SO commenting practice [5].

A comparative study was designed to contrast user behaviour and experience with AS and SO players. Each participant watched two similar video clips in succession using

AS or SO, with watching order counterbalanced by clip and player to avoid bias (Table 1). The video clips were both of speeches by UK politicians in the same political party; David Cameron (7'23") and Theresa May (5'56") (Figure 1 and 2). The physical setting and camera framing were almost identical, both having been filmed outside No 10 Downing Street, London, UK.

Twenty participants in total were recruited for this study, four of whom had previously seen Theresa May's and three David Cameron's speech and so were randomly allocated across order groups. Participants were briefed to interact with the video player however they liked, using play, pause and rewind buttons. A fill-the-blanks memory test was completed for video content after each clip, and free-text response for 'three or more comments which interested you'. The session concluded with a semi-structured interview that asked about potential comment posting as well as reading and understanding video content. Although the players did not actually allow them to do this, we noted their response to the idea of commenting with the particular player they had been using. All sessions were video recorded and the interviews were transcribed for analysis.

Findings

Our findings are derived from an inductive analysis of all data, including interview transcripts, and supported by events captured in video recordings of user behaviour. We first discuss memory for clips and comments before considering broader experiential issues.

Memorability of video content and comments

Most participants recalled significantly more comments of interest with the SO than AS players ($t=3.37$, $20df$; $p=.028$). However, SO and AS players did not influence recall of video clip content itself (the speeches): neither blank-filling

¹<https://github.com/jabbany/ABPlayerHTML5>

²<https://getbootstrap.com>

Comments	Theresa May	David Cameron
Overlaid	a1	b1
Appended	b2	a2

Table 1: Combinations of videos and commenting styles

Group	1st Video	2nd Video
A	a1	a2
B	b1	b2
C	a2	a1
D	b2	b1

Table 2: Participant groups divided by watching order

nor the general questions at interview suggest a difference in this respect. However, in the interviews 12 out of 20 participants stated that overlaid comments interfered with their ability to pay attention to the videos. Most said that the separation of comments from video content reduced the sense of confusion they felt about what they should attend to.

Dynamic complementarity of engagement

Participants reported that watching clips was more fun in SO than AS because they had a stronger sense of what other viewers were feeling. With SO, the comments seemed to reinforce the content of the clip. The synchronization was appreciated by six of the participants: automatic presentation of comments seemed to improve relevance so that there was a strong sense of what others were thinking moment-to-moment. For example *"the comments in the video make me feel like staying together with others"*. Some participants felt that they were interacting with other people with SO in a way that was absent in their experience with AS. Another participant said it looked as though someone was *"live tweeting"* within the video, even though they knew this was not true.

Control behaviour

In the interviews, seven participants mentioned the paradoxical tension between control efficiency and attentional complexity of reading comments in SO compared to AS. Participants said it was more *"convenient"* to watch video and comments synchronously. However, three participants complained about the *"racing movement"* of overlaid comments. Overlaid comments were described as *"quick"*, or *"very fast"*, and also sometimes *"so many"*. During the study, six participants hit pause at moments with SO when they said they simply could not follow the comments displayed at that time. However, four participants showed no interest in adding comments with AS but wanted to with SO.

Discussion and Conclusions

In this paper, we considered how user engagement might be influenced by the design of dynamic media players that incorporate commenting mechanisms. The growth of 'dan-maku' Synchronous Overlaid (SO) commenting mechanisms suggest a design direction towards closer integration of collective experience with time-varying media. However, SO designs present users with challenges for sharing their attention between media content and comments. We reported a comparative study that was intended to explore the influences of alternative interactions with comments around video clips. Our findings suggest that the design model for commenting is highly likely to influence user control behaviours, including the use of pause and rewind during watching and checking back afterwards. Our findings for memorability and attentional demand appear to be contradictory: SO was described as confusing but memory for video content appears similar to the AS player. We suggest that a sense of collective engagement may have increased viewers' level of arousal so that they could compensate for the higher concentration required by SO. Further research is required to determine how social engagement and concentration may work together or act in opposition, if this suggestion is to be tested. Also, we combined adjacency with asynchronous control in our AS model. Further work is needed to disentangle their respective influences.

The comparative study reported in this paper used videos of political speeches. It is well known that political opinions affect how people process information, with a bias to attend to consonant views and to ignore dissonant information [2]. Modes of interaction with comments and video content are likely to be influenced by prior attitudes. We encourage other researchers to consider the potential influence of attitude involvement on interactions with comments and wider involvement with relevant online communities.

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